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PREPARE THE FIGHTER FORCE-RED FLAG/COMPOSITE FORCE

A thesis presented to the Faculty of the U.S. Army
Command and General Staff College in partial
fulfillment of the requirements for the
degree

MASTER OF MILITARY ART AND SCIENCE

by

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B.S., Michigan Technological University, 1967

Fort Leavenworth, Kansas
1980

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REPORT DOCUMENTATION PAGE		READ INSTRUCTIONS BEFORE COMPLETING FORM
1. REPORT NUMBER	2. GOVT ACCESSION NO.	3. RECIPIENT'S CATALOG NUMBER
	AD-A094 982	
4. TITLE (and Subtitle)	5. TYPE OF REPORT & PERIOD COVERED	
Prepare The Fighter Force-Red Flag/Composite Force	1 6 June 80	
	6. PERFORMING ORG. REPORT NUMBER	
7. AUTHOR(s)	8. CONTRACT OR GRANT NUMBER(s)	
Ronald L. Rusing, MAJ, USAF		
9. PERFORMING ORGANIZATION NAME AND ADDRESS	10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS	
Student at the U.S. Army Command and General Staff College, Fort Leavenworth, Kansas 66027		
11. CONTROLLING OFFICE NAME AND ADDRESS	12. REPORT DATE	
U.S. Army Command and General Staff College ATTN: ATZLSW-DC-MS	6 June 80	
	13. NUMBER OF PAGES	
	64	
14. MONITORING AGENCY NAME & ADDRESS (if different from Controlling Office)	15. SECURITY CLASS. (of this report)	
	Unclassified	
	15a. DECLASSIFICATION/DOWNGRADING SCHEDULE	
16. DISTRIBUTION STATEMENT (of this Report)		
Approved for public release; distribution unlimited.		
17. DISTRIBUTION STATEMENT (of the abstract entered in Block 20, if different from Report)		
Approved for public release; distribution unlimited.		
18. SUPPLEMENTARY NOTES		
Master of Military Art and Science (MMAS) thesis prepared at CGSC in partial fulfillment of the Masters Program requirements, U.S. Army Command and General Staff College, Fort Leavenworth, Kansas 66027		
19. KEY WORDS (Continue on reverse side if necessary and identify by block number)		
Realistic Fighter Training Red Flag Composite Force		
20. ABSTRACT (Continue on reverse side if necessary and identify by block number)		
This thesis addresses current realistic training capabilities and concentrates on two realistic training programs - Red Flag and Composite Force - providing an in depth study and single source document on all aspects of these programs. Current realistic training programs are helping prepare the fighter force for future contingencies.		
See Reverse.		

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(initials)

Prepare The Fighter Force - Red Flag/Composite Force.

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6 June 1980

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A Master of Military Art and Science thesis presented to the faculty
of the U.S. Army Command and General Staff College, Fort Leavenworth,
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Director, Graduate Degree Programs.

The opinions and conclusions expressed herein are those of the student author and do not necessarily represent the views of the US Army Command and General Staff College or any other governmental agency. (References to this study should include the foregoing statement).

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ABSTRACT

PREPARE THE FIGHTER FORCE - RED FLAG/COMPOSITE FORCE, by Major Ronald L. Rusing, USAF, 64 pages.

Historical evidence of World War II, Korea and South East Asia has provided alarming statistics concerning survivability of aircrews and past preparations by Tactical Air Forces' (TAF). A void existed between combat and peacetime training. After Vietnam, training programs were adopted to bridge this void, and to provide a realistic training environment for the TAF's. The objective of realistic training is to reduce those past statistical nightmares of aircrews being lost within their first ten combat missions, by allowing aircrews to experience their first ten combat missions before any advent of hostilities. Current realistic training capabilities of two realistic training programs - Red Flag and Composite Force are addressed in this thesis - providing an in depth study and single source document on all aspects of these programs. Additionally, these programs and the importance they represent are projected into future training efforts.

Realistic training programs are helping prepare the fighter force for future contingencies. Emphasis must be channelized on expanding and improving these programs. Realistic training concepts are gathering momentum and must continue to keep moving in a productive direction to maximize our military potential.

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CHAPTER 1

INTRODUCTION

Training for Tactical Air Forces has taken on new dimensions over the past few years. Tactical Air Command (TAC) has been concentrating its efforts on increasing combat readiness. The previous commander of TAC, General Robert J. Dixon, stated: "Readiness will be the key to our success - perhaps our national survival." (12:40) In view of the potential threat and need to squeeze all combat capability possible out of existing resources, realistic training programs such as Red Flag and Composite Force* were developed. (1)

Sophistication of weapon systems and munitions requires considerable emphasis on training and tactics to maximize their effectiveness. Aircrews must thoroughly understand and be capable of employing the advanced systems to their full potential, otherwise technological break-throughs were for naught.

Historical Review

History seems to have a way of repeating itself, and the United States Tactical Air Forces' story is no exception. The Air Force has a poor record for maintaining the proficiency of its fighting forces between conflicts. Aircrews entered previous conflicts with a relatively low level of proficiency, not necessarily aircraft and weapons proficiency, but combat proficiency - the ability and

*Words underlined are defined in the Glossary of Terms.

FIGHTING PROFICIENCY

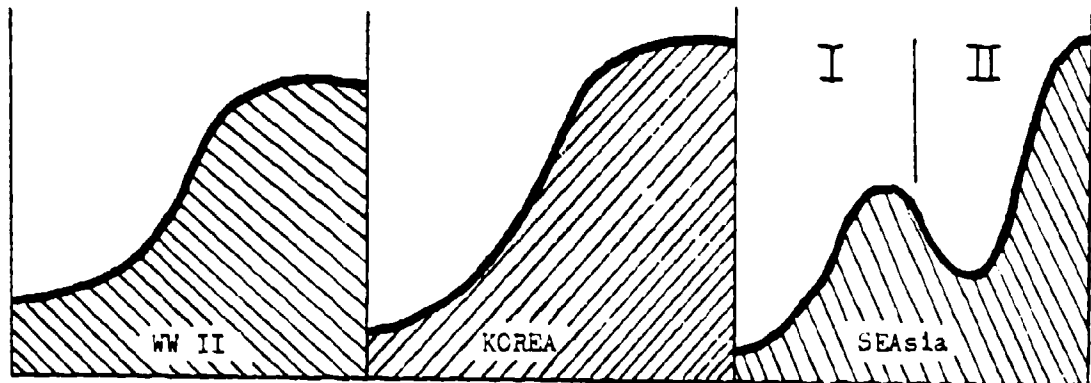


Fig:1-1 SOURCE: Presentation to Kansas National Guard by Lt. Gen. James D. Hughes, 16 April 1977, Slide #15. (46)

experience to perform effectively while operating in an actual threat environment. Near the end of each conflict that proficiency level was rather high, but after the conflict it dropped off drastically.

(Fig:1-1)

At the outbreak of World War II, the Air Force was able to mass a total of 900 planes, most of which were obsolete, at various bases overseas. President Roosevelt called upon the American industry to "increase aircraft production, from 2000 planes a year to 4000 planes a month, a dream that took time to make a reality." (10:105) Additional pilots needed to be trained to support the influx of new planes. Unfortunately, most pilots received only basic flying proficiency. The majority of the new pilots received their first tactical experience in actual combat, and therefore initial losses were very high.

World War II remains the only war where there was truly a contest of airpower between 1940 and 1944. The years of heavy attrition were made easier by the RAF, who held off the Germans until we were ready the Germans clearly had the best airplanes ... but not enough

of them to counter our overwhelming numbers. (21:18)

What could not be done with tactical expertise was done with mass of airpower.

After World War II the majority of aircraft available in the Tactical Air Forces (TAF's) were of the piston driven variety. Even though a few new jet aircraft were operational, most of the training involved the older aircraft. Since the emphasis was on strategic employment (10:147), tactical proficiency levels dropped off until entry into the Korean conflict.

Just as achieving air superiority was the first concern in World War II, it also became the top priority mission in the Korean War air superiority was perhaps even more important in Korea because of the superiority in numbers of the Chinese ground forces over the ground forces of the United Nations Command. (11:113)

Korea provided the United States Tactical Air Forces one of its finest moments by achieving air supremacy over an initially superior MIG force. However, "Lady Luck" was on our side. "The Russians either discarded, or stupidly overlooked, the tool which could have assured a swift and complete victory. Soviet MIG's were operational in numbers...." (10:151) The employment of F-84, F-80 and F-51 fighter-bombers was concentrated in the air-to-ground arena, and was no match for the rival MIG's. The F-86's, on the other hand, were able to control the skies and provide the necessary security from the airborne threat.

The ill-prepared planes of the Fifth Air Force, ... were yet able to gain air dominance quickly because Russians failed to replace destroyed North Korean aircraft, or because they had failed to train sufficient North Korean pilots for replacement machines. (10:151)

If the Soviet decision had been different the "9 or 10:1 ratio in favour of the Americans" (16:823) might have been in favour of the North

Koreans. "Of course the [North Korean Air Force] NKAf was not all Korean, but basically Chinese with Russian and Polish pilots as well." (11:114)

Experience was also a key factor because of the relatively short period between World War II and the Korean conflict; combat aviator veterans were available to employ their previous tactical skills learned during World War II. "Despite a shortage of equipment, the high level of experience permitted expansion and modernization of the Tactical Air Forces when they were needed in Korea." (11:3) This accounted for the rapid rise in combat proficiency during the initial part of the war.

Following the cease-fire in Korea, strategic doctrine and nuclear weapons were once again the center of attention.

.... Nuclear forces were accepted as the dominant element of our national defense forces were evaluated in light of their usefulness in the event of nuclear conflict. Resources allocated to non-nuclear forces were sufficient only to fight a brief, very limited war. (11:6)

Strategic Air Command (SAC) was unquestionably the cornerstone of defense policy with the TAF's emphasizing nuclear delivery techniques in its shadow. "The tactical side of the United States Air Force was trying its best to look strategic." (22:52)

Success in the air-to-air arena in Korea may have added a false sense of security as far as the TAF's capabilities were concerned. The lopsided statistical evidence of the air-to-air engagements could be misconstrued to mean that aviators need only limited training to maintain proficiency. Aircrews flew a variety of missions and became "jacks of all trades" and in reality, masters of none. Diversification gave aircrews mission exposure, but it did not allow for in depth concentration of individual tactical skills. Mission accomplishment

and success were attributed to the residuum of World War II experienced aircrews initiating innovative tactics. When the South East Asia (SEA) conflict developed many years had passed since Korea, and along with that, much of the tactical expertise and many of the experienced fighter force.

The first few years in Vietnam, tactical forces were building up combat proficiency, and even though the North Vietnamese Air Force was small and tactically conservative, it was a tough adversary. The USAF kill:loss ratio of 2.25:1 in Vietnam is not very impressive compared to the ratio of 9 or 10:1 in Korea. (16:823)

Learning from past performances was, and has not been one of the Air Force's virtues. Twice in Vietnam, upon initial entry into conflict and again following the resumption of bombing of North Vietnam in 1969, the Air Force found itself in the agonizing position of putting inexperienced aircrews into combat.

Statistical evidence [from World War II, Korea and Vietnam] supports TAC's thesis that most losses occur during a pilot's first eight to ten missions; if he survives, he matures into a combat veteran with "good survivability". (31:24)

Since the first ten missions are critical, realistic training is needed to focus on increasing combat readiness and experience of the aircrews in order to reduce this statistical nightmare. Realistic training was obviously the answer.

Problem Statement

What capabilities exist for providing realistic training for the Tactical Air Forces (TAF), and will it prepare the aircrews for future conflicts? Actual combat is the only way to truly evaluate our competence and answer this question. However, the existence of realistic training programs should help to enhance and validate

our ability to project our fighter force.

Purpose

The objective of realistic training is to fill those void areas between conflicts with training that allows every aircrew to experience the first ten combat missions over and over again before the actual advent of renewed hostilities. Dr. James R. Schlesinger, a former Secretary of Defense said: "A strong conventional capability 'is more than ever necessary [as strategic parity between the US and USSR makes full-scale nuclear war unlikely], not because we wish to wage conventional war, but because we do not wish to wage any war'."

(32:29) Regardless of the circumstances the Tactical Air Forces must be ready. This study will provide a consolidated document which focuses on that realistic training already available and what benefits have been derived from that training.

Methodology

To properly evaluate the type training Tactical Air Forces have received, a review of past conflicts is necessary. The Air Forces' past preparation and the overall results are examined in Chapter I. Historical references provided a guide for future training and the need for realistic training.

Red Flag, discussed in Chapter II, is the most well known current realistic training program. Its concepts and objectives are covered in detail from its inception to the present. Red Flag provides a training arena for aircrews, and together with its sophisticated facilities and innovative procedures, it promotes combat readiness.

Composite Force is not a new concept and was used extensively during the Vietnam conflict. Composite Force provides the means to

further increase realistic training on a more continuous basis. Emphasis is on the variety of programs already underway, and the importance of these intense programs is explained in Chapter III.

The programs and concepts addressed in Chapter II and III are tied together in Chapter IV and projects into the future possibilities for realistic TAF training. Realistic training varies in complexity and magnitude, and is only limited by our imagination.

A summarization, conclusions and recommendations are provided in Chapter V.

Assumptions and Limitations

Training TAF's is an extremely broad topic, therefore in this study initial qualification training and aircrew continuation training will only be discussed briefly. The focus of this paper will be on providing realistic training for the fighter force in preparation for the next conventional battle. All information discussed will be unclassified, and therefore, accessible to a wider audience.

CHAPTER II

RED FLAG

At the conclusion of the South East Asian (SEA) conflict, the Tactical Air Forces (TAF) possessed a high degree of combat experience. However, it wouldn't be long before history started to repeat itself, and the combat experience in the fighter units would start to dwindle. Tactical Air Command (TAC) surged forward to develop a new more realistic training program called Red Flag, with the hope of maintaining combat proficiency of the experienced aircrews and exposing new crews to a high threat environment.

Conception to Inception

TAC's training concepts have evolved over the years. Aircrew initial qualification and continuation training programs were oriented toward flying time and event accomplishment, often aimed at "filling squares" and preparing for Operational Readiness Inspections. Aircrews were expected to qualify in air-to-air and air-to-ground missions and maintain proficiency throughout the entire spectrum of combat requirements. It was impossible to be combat ready in every mission requirement considering today's modern sophisticated weapons systems.

Implementation of the Designed Operation Capability (DOC) concept was an improvement. TAC fighter wings were given a primary mission (air-to-air or air-to-ground) and required to concentrate their training efforts toward that mission, and to dedicate more attention to the improvement of specific tactical skills.

Meanwhile, Headquarters, United States Air Force, Tactics Division Staff members were formulating the concepts for a new proposed realistic training program. Once the concepts had been developed and a briefing was prepared, Major Moody Suter, then a member of the Tactics Staff, provided the title "Red Flag" to the new proposed program.

He goes on to recall that:

It [Red Flag] was the idea of the line jocks The concept entailed a huge project with a lot of work, risk and money required - and the results [may] never be measured initial briefings were at the action officer level to shake the bugs out and learn to answer the hard questions. Next the one and two star level to find out why it wouldn't work, and finally the three star level for approval to take it to TAC. (52:2)

In mid-1975 Headquarters, TAC received the Air Staff briefing on the concepts of Red Flag. General Dixon, then Commander of TAC, was very impressed with the idea. Subsequently, General Dixon received a message from the Office of the Chief of Staff of the Air Force in reference to the "Red Flag concept."

Comments from my staff indicate your enthusiastic support of the Red Flag concept presented to you by Maj. Suter on 15 July 1975. I feel this concept has potential to compliment programs which you have already implemented to improve the force. Request you take lead in development, validation and implementation of this concept to provide a model for the TAF. (47:1)

With message in hand, General Dixon added his own comments on the bottom and sent it to his staff. "Now let's get it laid out in a briefing which we can use as the model for the project...." (47:1)

The concept was immediately put into action, and Nellis Air Force Base (AFB), Nevada was selected as the site for the operation. The Tactical Fighter Weapons Center (TFWC) was assigned as manager of the program and instructed to conduct the first exercise before the end of 1975.

Organization

The Tactical Fighter Weapons Center (TFWC) works directly for Headquarters TAC and is responsible for the entire Red Flag program. The 4440th Tactical Fighter Training Group (TFTG), within TFWC, constitutes the nucleus of the Red Flag organization. The 4440th, as the primary Red Flag staff, fuses together Blue (friendly) and Red (threat) Forces under a single manager to provide continuous combat training for squadron size units, complementary support forces, and other major commands and services.

The Red Forces include the ground threats, such as anti-aircraft artillery (AAA), surface-to-air missiles (SAM), radars, and electronic warfare (EW) equipment, under the control of the Nellis Range Group. The Aggressors represent the air-threat and have representatives on the Red Flag staff.

The majority of the Blue Forces are the actual unit participants which deploy into Nellis AFB. The units which comprise the Blue Forces differ with each Red Flag exercise, however, a permanent Blue Force staff is assigned to the 4440th TFTG.

The Blue Force staff develops the operation plan (OPLAN) and daily scenarios or fragmentary orders for each exercise. A variety of scenarios are formulated for each particular exercise which focus on the participating units primary missions. Close coordination with representatives of the participating units, threat units, support units, and range units provides the necessary inputs for each exercise. Once the scenarios have been developed and the fragmentary orders distributed, it is up to the Red and Blue Force Commanders to accomplish the assigned missions within guidance of the special operating instructions (SPINS).

As an additional part of the Red Flag staff, the White (neutral) Force functions primarily as umpires or evaluators during the exercise. They review and evaluate data from a variety of sources: mission debriefing forms, radar warning receiver (RWR) and electronic warfare (EW) data cards, gun camera and scope film, in-flight recordings, threat display feedback, and oral debriefings. Transcribing collected data into computers allows for rapid analysis of results or trends, and provides a storage bank for future reference. After the exercise has been terminated, and all available data has been evaluated, a Red Flag After Action Report is published and distributed to all the participants and their respective command headquarters.

Aggressors

The Air Force's performance in the air-war in SEA was "less than shining" and eventually led to the development of the Aggressors. During the late 1960's both Navy and Air Force fighters were being lost at about the same ratio as the threat forces. The Navy was able to remedy this situation early by developing a "Top Gun" program at Miramar Naval Air Station in 1968 for their F-4 air-to-air aircrews. (16:824) The Air Force on the other hand was less successful because their F-4's were tasked for multi-purpose missions ranging from close air support, air interdiction and air superiority. Concurrently, Air Defense Command (ADC), while improving the effectiveness of the aging F-106, realized its potential as an agile "dog fighter". However, unlike the Navy, the Air Force did not have an adequate training facility and was unable to take full advantage of the F-106 dissimilar training capability. Some Air Force aircrews participated in the ADC F-106 program before going to SEA, and were able to improve

their success rate. Even with this improvement, the Air Force statistics declined, while the Navy improved tremendously. Because of the improved results from the Navy and ADC F-106 program, TAC was spurred into organizing the first Aggressor squadron (64th Fighter Weapons Squadron) at Nellis AFB in October 1972. (16:825)

While addressing the Tactical Air Powers Subcommittee of the Senate Armed Services Committee in 1975 concerning rationale for development of the Aggressors, Lt. Col. Nabors, then Commander of the Aggressor Squadron, stated:

"During the Southeast Asia conflict The most common problem found could be summed up in the words 'insufficient training and experience in air-to-air combat' aerial engagements depend upon performance characteristics of your aircraft versus your adversary's ... correct estimation of his range ... knowledge of his tactics similiar aircraft training - for example F-4 versus F-4 - was unsatisfactory when engaging better turning MIG aircraft lookout procedures and training [were] grossly inadequate to detect the smaller MIG's Even when detected, crucial errors were made in visual range estimation ... aerial maneuvers [were] being employed at the wrong point ... or not at all." (16:825)

The Aggressors initially flew the T-38 Talon while preparing for delivery of the F-5E Tiger II. Both the T-38 and F-5E were similiar in size, however, the F-5E more closely matched the performance of the MIG-21. Aggressor crews are trained in Soviet tactics and provide an extremely realistic "enemy" air threat.

Formation of the Aggressors provided the opportunity for TAF aircrews to train against aircraft whose size and performance characteristics compare with those of Soviet MIG's. Aggressors "emulate, fly and fight like Soviet pilots This includes the variations in basic tactics employed by pilots on the Red Chinese and Warsaw Pact air forces." (28:153) Experienced aircrews study in depth the enemy fighter pilot and learn his tactics. Radar controllers

are thoroughly schooled on Soviet intercept procedures. The combination of experienced aerial tacticians and radar controllers insures that the Aggressors are a formidable adversary.

Even though much of the Aggressor operation focuses around Nellis AFB and Red Flag, "the key mission of the Aggressor Squadron is to provide Dissimilar Air Combat Training (DACT), plus academic instruction for all Tactical Air Command combat and training units." (16:826) The Aggressors at Nellis currently have two squadrons, and the Aggressor program has expanded into the European theater with one squadron in RAF Alconbury, United Kingdom, and the Pacific theater with one squadron at Clark AFB, Phillipines to provide air-to-air training to their respective TAF's. (28:153)

Facilities and Equipment

The Range at Nellis, fanning out roughly 150 miles north-east and northwest from Nellis, [is the largest military controlled range in the United States and] comes pretty close to the area which 4th Allied Tactical Air Force could have to cover supporting U.S. Army's VII Corps in southern Germany. (25:6) (Fig:2-1)

The range and associated unencumbered flying areas provide over six million acres of desert and mountainous terrain for realistic training. Throughout the range complex target arrays accurately simulate enemy AAA, SAM, Soviet tank formations, railroad yards, bridges and tunnels, industrial complexes, staging areas, airfields, truck convoys, communication jamming and enemy radar equipment, or any variety of combinations.

Within the range area, and occupying approximately three million acres, is an extensive electronic warfare (EW) range complex to add even more realism to the missions. Simulated enemy AAA, SAM, and radar emitters, which were developed from existing resources

EUROPE-NELLIS RANGE COMPLEX COMPARISON

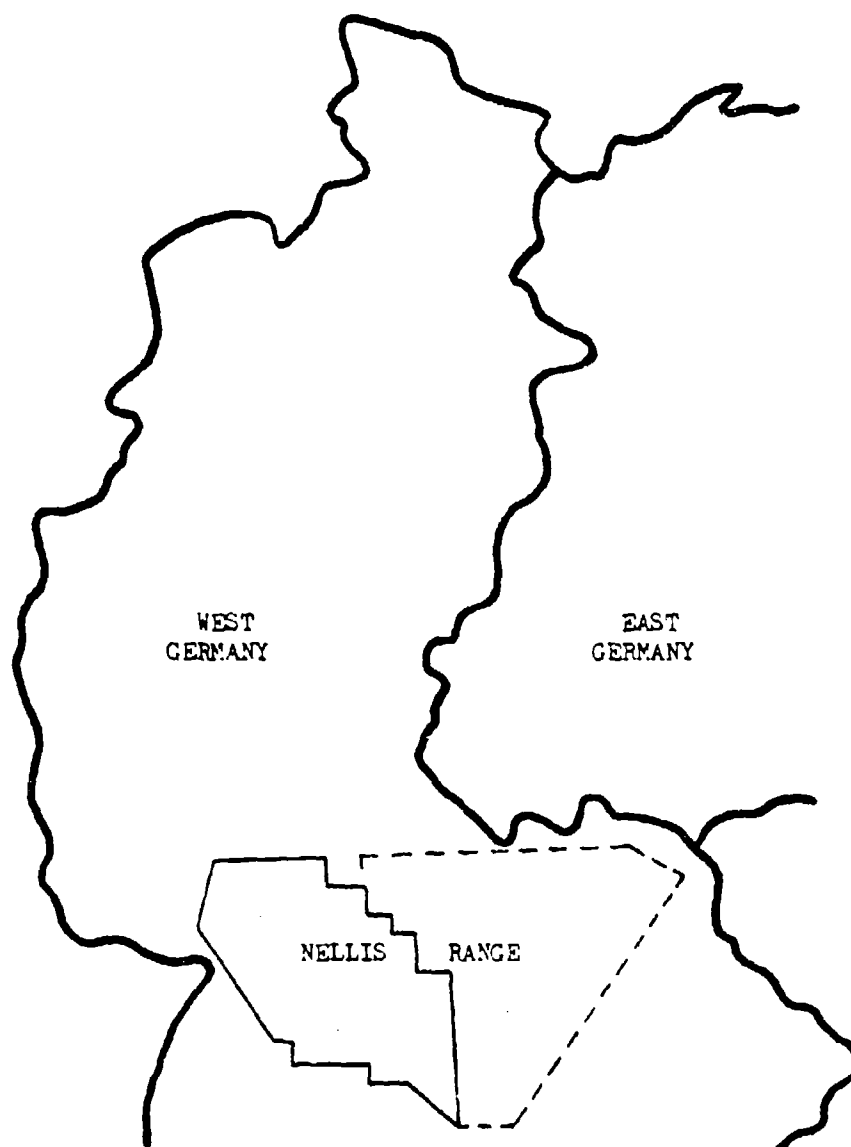


Fig:2-1 SOURCE: Presentation to Kansas National Guard by Lt. Gen. James D. Hughes, 16 April 1977, Slide #27. (46)

and actual enemy equipment are located throughout this area. A spokesman for the Nellis Range Group, which handles all the ground electronic simulations, stated:

"We have organized our capabilities to simulate Warsaw Pact hardware, command-and-control methods and overall management as closely as we can Today we are perhaps five to eight years behind the current European environment - we're probably simulating very closely what pilots faced flying in Hanoi - Haiphong at the end of the Vietnam War To do a really effective job, we need higher densities in our threats plans call for an increase in threats by more than a factor of three over the next six fiscal years" (19:70)

To the southwest of the Nellis range complex is the Army's National Training Center, Fort Irwin, which is used for joint Army-Air Force training. Additionally, farther to the north and close to Salt Lake City, Utah, is the Hill-Wendover-Dugway range complex. Red Flag operations occasionally use this range to increase the number of scenarios, and provide additional realistic training by operating over unfamiliar ranges. Costs for opening and maintaining this range area are extensive, therefore its use is limited.

Facilities at Nellis AFB include a large ramp area to accommodate exercise/support aircraft and those permanent unit's aircraft stationed there. A dedicated portion of the 4440th TFWG building has been reserved for exercise participants and includes several individual briefing rooms, a main briefing room, and a centrally located operations area. In the main briefing room is a large computerized screen which is tied directly into the Range Control Center (RCC) and TFWC main computer system. The large display screen in the RCC is referred to as the "Big Board". The computerized screen and "Big Board" allow aircrews to follow complete mission scenarios throughout the range complex by way of computerized trace displays. These displays are produced by identification friend or foe (IFF) transponders on the aircraft and Federal Aviation Agency

(FAA) radar tie ins which are transmitted to the TFWC main computer system in the RCC. Red Flag equipment and facilities continue to improve and strengthen the training environment.

Training Operations

Selected units begin to prepare for Red Flag months prior to the actual deployment. Unit representatives help the Red Flag staff construct tentative scenarios for their particular exercise. Training and preparation at individual home stations is keyed toward the up-coming exercise. Prior to the deployment of the participating aircraft, unit support personnel and equipment arrive via Military Airlift Command (MAC) aircraft (C-141, C-5, C-130) and set up their support operation in existing facilities. The actual Red Flag exercise does not begin until the unit's normal mobility deployment to Nellis is complete.

Once the units are in place they are given their appropriate fragmentary orders. Even though they are co-located with members of the Red Flag staff, minimal command guidance is provided during the employment phase. Units plan their air missions, select ordnance loads, and develop the appropriate tactics deemed necessary to accomplish the mission.

Initially all participating units receive an extensive mass briefing from the Red Flag staff concerning concept of operation, range and local airspace restrictions, and peculiarities which will affect this particular exercise. The following are typical scenarios which an air-to-ground unit would receive while at Red Flag:

Orientation: The first sortie flown by all the crews is an orientation mission. This allows the aircrews the opportunity to familiarize themselves with local airspace and range procedures. Aircraft, radar

warning receiver (RWR) and electronic countermeasure (ECM) systems are checked and evaluated against the ranges electronic warfare (EW) equipment.

Dissimilar air combat training (DACT): Allows aircrews to upgrade their currency and proficiency in the air-to-air arena against dissimilar aircraft (Aggressors). This enables aircrews to participate fully in the air-war throughout the remainder of the exercise.

Close air support (CAS): This scenario provides the opportunity for aircrews to train with both ground and airborne forward air controllers (FAC) in a multi-threat environment. Communication jamming and voice intrusion are used effectively to add realism.

Strike control and reconnaissance (SCAR): This mission emulates the role of the "fast FAC" which was used in Vietnam. RF-4C reconnaissance aircraft locate targets and egress out of the threat area to a pre-determined rendezvous point where they join up with a fighter strike flight. The RF-4C leads the strike fighter back into the target area and marks the position of the target with either photo-flash cartridges or white phosphorus rockets. After the target has been attacked, the RF-4C takes post-reconnaissance photos of the strike and is escorted back to the air base by the fighters.

Interdiction: These missions attack deep into enemy territory against highly defended targets such as bridges, staging areas, industrial and railroad complexes, and require extensive planning.

Combat air patrol (CAP)/Escort: These aircraft are responsible for area and point defense. Missions include escort for bombers, cargo, and strike aircraft into a sophisticated enemy air defense network.

Composite strike: This scenario is the final mission before the aircrews redeploy to their permanent bases. It is the most

complicated and involves all the participating units in a mass strike scenario. A mix of support aircraft compliment the main strike force. These include CAP to escort strike flights, ECM aircraft to jam enemy radars, Wild Weasel aircraft to suppress SAM's, and reconnaissance aircraft to provide bomb damage assessment (BDA) photography. Pre-dawn strikes against command and control installations are performed by Strategic Air Command (SAC) bombers and TAC F-111's. The success of a mission of this magnitude depends on the indepth planning, command and control, and proper execution of all participants. This is the final test from the previous weeks lessons learned.

Scenarios for a unit with an air-to-air primary mission will include some of the same missions with increased emphasis on the air-to-air arena.

While the primary scenarios are being flown other auxiliary missions such as reconnaissance, Wild Weasel, and search and rescue (SAR) are on going. Probably the SAR is regarded as the most realistic of those mentioned and provides an actual survival situation.

Pilots who were [simulated] "shot down" the day before are briefed by Air Training Command (ATC) search and rescue experts, then airlifted to a desolate point in the southern Nevada desert where computers say they would have landed. Here they must evade "enemy" search parties while attempting to contact the "friendlies." (17:5)

Survivors have only that equipment which would have been carried in the aircraft in which to make contact with friendly forces and effect a successful rescue. Both ground and airborne threats will continue to pressure the survivor and SAR forces. To add more realism, injuries are simulated and survivors are required to follow strict escape and evasion scenarios. Aircrews are impressed with training of this type and one typical comment about the SAR operation was:

"Tremendous benefit because I had no previous training in this area. If the need ever arose, I would now be better prepared to effect a rendezvous and pick-up." (17:7)

After the last combat missions are flown, the day climaxes with a mass debriefing of all participants, both Red and Blue Forces, to discuss results for that particular day. Participants who are not physically located at Nellis AFB, telephonically pass their missions critiques to members of the Red Flag staff. These results and comments are consolidated and relayed to the other participants at the mass debriefing. Each mission commander briefs his particular mission and results, both positive and negative. Emphasis is placed on being candid and realize your good points and understanding your mistakes. No longer is it the individual with the fastest mouth and smooth hands who dominates these mass debriefings. "Own up and learn from your mistakes, that's what you're here for" is a common expression I have heard while attending these debriefings. What most new individuals don't realize is that somewhere, either a ground threat optical recorder, inflight camera, computer trace or visually, there is some record of authentication as to your results, whether it be successful or unsuccessful. The Red Flag mass debriefings are a real learning experience, with emphasis on learning.

Participants

The first Red Flag exercise in November 1975 consisted of 35 aircraft from eight different units which flew 552 sorties in eight air-to-ground scenarios. Since that time the number of participants, aircraft, and scenarios have increased dramatically. The exercise ending in August 1979 involved 152 aircraft from 44 units for a total of 2278 sorties. (49)

Even though Red Flag is keyed toward the fighter force in TAC; other major commands such as MAC, SAC, ADC, Air National Guard and Air Force Reserves participate on a regular basis. Sister service units from the Navy, Marines, and Army are becoming an intricate part of the Red Flag operation. Aircrews from the United States Air Force Europe (USAFE) and Pacific Air Force (PACAF) occasionally take part in realistic scenarios. Additionally, Red Flag provides worldwide significance and involves many of our allies.

All branches of the U.S. armed services participate in Red Flag exercises, and entire units from Canada and the United Kingdom have also experienced the ultra-realistic Red Flag "games". (19:69)

In addition, exchange pilots from ... Australia, New Zealand, [South Korea], and West Germany have flown in Red Flag exercises. Observers from other nations including France, Israel, Japan, Sweden, Pakistan, Mexico, Columbia, Norway, Denmark, Portugal and Italy have visited Nellis NATO chiefs and NATO Parliamentary Committee, as well as top representatives from the Allied Air Force, Central Europe, have spent time with Red Flag. (18:40)

The list of Allied participants will continue to increase and everyone concerned should benefit from the experience.

Due to budget constraints and the limitations on existing facilities, the number of United States tactical units which participate in Red Flag each year is restricted. On an average, fighter units in TAC participate on a semiannual basis.

Originally, each exercise period was scheduled for four-weeks during which units would rotate crews and support personnel after two weeks. Each two-week segment provided identical mission scenario schedules to provide a standardized level of training to all participating unit aircrews. Recently the number of exercises has been decreased from ten to eight per year to reduce airlift costs while

training the same number of units. This has been accomplished by lengthening four exercise periods to six-weeks while still breaking them down into identical two-week segments. The remaining periods continue to be four-weeks, with two of these periods taking place at CAF Cold Lake, Alberta, Canada. Maple Flag is the name of this Canadian-British-U.S. joint exercise in Canada. Even though the Canadians are the hosts, most of the planning, equipment, and participants are generated by the Red Flag staff.

Results

Since the inception of Red Flag in November of 1975, four years have passed. During this time period, the statistical evidence of this training operation is impressive. More than 65,000 aircraft sorties have been flown in Red Flag scenarios accounting for almost 110,000 flying hours. (Table:2-1) In 1978

the average Red Flag exercise involved 20 aircraft types flying close to 2000 sorties and 3000 hours. Aircraft that were involved included essentially every major type in the Air Force, Navy, Marine Corps, and Army inventories, plus the Air National Guard (19:72)

The results from 1979 showed that the sorties flown and flying time continued to increase, and 1980 appears to be off to a good start.

The figure that is most important is the number of aircrews trained. Over the first four years, more than 26,000 aircrew members have trained and been exposed to realistic Red Flag scenarios. This statistic is crucial when considering that in 1977, "four years after Linebacker II spelled the end of USAF's fighting role in SEA, only about a third of Tactical Air Command's primary operational crews have seen combat." (12:40) Three years have passed since that estimate, and the exodus of experienced combat fighter pilots still continues.

STATISTICAL SUMMARY OF RED FLAG AND MAPLE FLAG EXERCISES
NOV. '75-DEC. '79

EXERCISES	SORTIES FLOWN		HOURS FLOWN		AIRCREW TRAINING	
	EACH PERIOD	CUMULATIVE TOTAL	EACH PERIOD	CUMULATIVE TOTAL	EACH PERIOD	CUMULATIVE TOTAL
RF 75-1	552	552	670.7	670.7	80	80
RF 76-1 thru RF 76-7 (7 Exer.)	7,510	8,062	11,952.9	12,623.6	2,025	2,105
RF 77-1 thru RF 77-10 (10 Exer.)	14,987	23,049	24,741.5	37,365.1	6,577	8,682
RF 78-1 * thru RF 78-9 (10 Exer.)	18,081	41,130	30,359.6	67,724.7	5,856	14,538
RF 79-1 ** thru RF 79-9 (10 Exer.)	21,009	62,139	35,988.5	103,713.2	9,698	24,236
RF 80-1 * (2 Exer.)	3,334	65,473	6,189.7	109,902.9	1,825	26,061

Table:2-1 SOURCE: "Red Flag 75-1 thru 80-1." 4440th Tactical Fighter Training Group, Nellis AFB, Nev., February 1980.(49)

* Includes one Maple Flag exercise at CAF Cold Lake, Alberta, Canada.

** Includes two Maple Flag exercises.

Those lieutenants and captains who flew combat in 1974, if they still are in the Air Force, have completed approximately nine to fourteen years of service. Within another decade, most of these remaining combat aviators will also be lost.

The 26,000 aircrew figure does not accurately portray the actual number of aircrews that have participated in more than one Red

Flag. However, certain aircrews have been fortunate to participate in multiple Red Flags each year. Aircrews from units with unique missions, such as the Aggressors or Wild Weasels, fall into this category. Active fighter aircrews are normally scheduled to participate twice a year. The significant thing to remember is not the number of exercises a particular aircrew participates in, but the experience gained from that participation. Even with duplication of aircrews, a significant number of inexperienced aircrew members have had the opportunity to fly in a realistic combat environment, and that makes the figures impressive.

Figures which are not so impressive are the aircraft accident statistics. Accidents are inevitable, especially in fighter aircraft when you "train like your going to fight," (25:6) which is the Red Flag motto. However, Red Flag has accounted for 24 major accidents since its beginning. When comparing these results, based on flying hours, with both the Air Force and Tactical Air Command figures for 1979, the difference is enormous. (Table:2-2)

The hierarchy throughout TAC and the Air Force are concerned about the high accident rate. No one can rationalize or try to justify this alarming rate. Safety programs are paramount and stressed constantly during all Red Flag operations. Detailed rules of engagement (ROE); special operating instructions (SPINS); and other specific altitude, range and Federal Aviation Agency (FAA) restrictions are published for each exercise. Still, accidents happen.

One key point that must be understood is that the missions flown at Red Flag are not the typical "every day" missions flown throughout the remainder of the Air Force. These missions are planned in detail and focused on flying and fighting in a multi-threat environment. The scenarios are fast paced, and aircrews are constantly in a

AIRCRAFT ACCIDENT SUMMARY

ORGANIZATION	TIME PERIOD	APPROXIMATE TOTAL FLYING HOURS	ACCIDENT RATE PER 100,000 FLYING HOURS	TOTAL # ACCIDENTS
AIR FORCE	1979	3,000,000	2.8	78
TACTICAL AIR COMMAND	1979	550,000	6.3	35
RED FLAG	NOV.'75 to DEC.'79	110,000	21.8	24

Table:2-2 SOURCE: Aircraft Accident Summary. Headquarters, Tactical Air Command, Safety Statistics Branch. 14 February 1980. (40)

stressful situation while operating at low altitudes at extremely high speeds and avoiding threat defenses. Aircraft constantly operate in a congested and hazardous flying arena, whether their mission is air-to-ground or air-to-air. From a personal experience point of view, both as a combat experienced fighter pilot and participant in actual Red Flag scenarios, the risk is acceptable. What is not acceptable are those "dumb" accidents, caused by violating regulations and air discipline, that could have been avoided. These hurt Red Flag and more importantly realistic training.

The "bottom line" of Red Flag is to train aircrews in a reasonably safe and efficient realistic training environment. "Red Flag's purpose is not to put our aircrews to the ultimate test, (combat) To the contrary, it is designed to prevent such an event from ever occurring." (12:44) As Maj. General Charles A. Gabriel, then Deputy

Chief of Staff, Operations, Tactical Air Command, put it in 1977:

"Train our crews to 'peak' in peacetime, honing their fighting proficiency in realistic, large scale combat exercises." (24:18)

With emphasis on crew training, this is how the aircrews feel about their participation:

"Best training environment ever encountered."

"... not only lets me think about tactics but requires it!"

"The scenarios were realistic and the training received invaluable."

"Outstanding training the most realistic since actual combat."

"The Red Flag mission helped the aircrews who have never flown in combat to realize the demands placed upon them in a combat environment." (46:16)

National Guard units are included in almost every exercise. Not only do their aviators echo the previous comments, but the support personnel have their own definite opinions on Red Flag.

"Red Flag shows that a Guard unit can move right in on an Air Force base and work with Marines, Navy, anybody Guardsman can jump into a different environment without any change in procedure Something like Red Flag gives participants an idea of how big the mission is" (17:3)

Finally, an experienced combat veteran writes about Red Flag and states:

"We are not trying to relearn all the Southeast Asia lessons. We are trying to do some good realistic training for the next war." (12:41)

Participant comments are important, but so are the valuable lessons learned. Aircrews are encouraged to try safe innovative tactics, and learn for themselves the results. Over the years the relevant results are numerous and ranged from general topics with emphasis on: fuel management and the development of alternate airborne plans; to live munitions testing of air-to-ground missiles (AGM-65 Maverick) and other "smart bombs" against actual targets in a simulated threat environment; and finally those passive results such as revealing the

nature of ground shadows with low altitude aircraft and the effectiveness of camouflage paint schemes on aircraft. (55) The results of Red Flag continue to be creditable and influence realistic training throughout the TAF's. "In May 1977, Red Flag was named the corecipient of the Collier Trophy, the nation's oldest aviation award." (27:90)

When General Dixon was asked how he viewed the training at Red Flag he responded:

"Aircrews are being given a chance to try their ideas, to fly missions the way they think war should be fought, and to learn from their own mistakes men learn a lot more from mistakes than they do from rhetoric." (26:15)

CHAPTER III

COMPOSITE FORCE

From experience we know that combat demands the highest level of aircrew readiness. From history of past conflicts we know that, statistically speaking, most of our aircrew losses were within their first 10 missions of combat. Until Red Flag was conceptualized and developed to increase the readiness and experience of our aircrews, a void existed between combat and homeplate (home base) training. Red Flag has done a superb job in filling the major portion of that void by exposing our aircrews to a realistic training environment. In fact, Red Flag has proven to be our most effective realistic training short of actual combat. We "train for war as a daily diet." (24:18) Unfortunately, Red Flag participation is limited for many units to less than twice a year. After studying the results of past Red Flags, Tactical Air Command (TAC) realized that a gap still existed, and units were dedicating additional specialized homeplate training sorties just to prepare themselves for Red Flag. Composite Force Training (CFT) was developed to bridge the gap between Red Flag and homeplate training (Fig: 3-1), "The purpose of Composite Force Training is to provide a realistic environment in daily unit training." (5:1)

Formulation

The initial development of the CFT concept dates back to the Vietnam era on missions such as "Linebacker". We in fact were using the CFT concept in an actual combat environment. After Vietnam,

AIRCREW READINESS

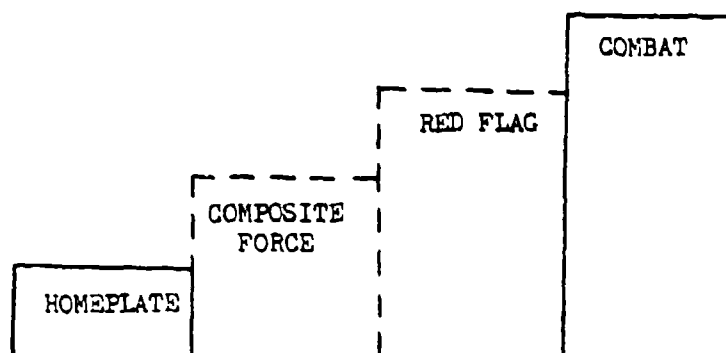


Fig:3-1 SOURCE: Headquarters, Twelfth Air Force Briefing. "Composite Force Training." Prepared for Tactical Air Command Commanders Conference, Homestead AFB, Florida, Spring 1979, Slide #2. (45)

emphasis was on realistic training and the development of Red Flag. As previously mentioned, units were dedicating additional training missions in preparation for Red Flag. These preparatory missions could have been categorized as CFT.

It appears, after consulting with the Headquarters, TAC Historical section, that the actual present day CFT model which was used, originated with the 1st Tactical Fighter Wing (TFW) at Langley AFB, VA. in Spring 1978. In preparation for an up-coming Operational Readiness Inspection (ORI), the 1st TFW conducted extensive training which was comparable to that provided at Red Flag. (39)

The preparation by the 1st TFW included participation by other Ninth Air Force units, and the results were highly successful. Headquarters, Ninth Air Force analyzed these results and the size of that specific operation, and developed a NAF letter of instruction for future Ninth Air Force exercises known as CFT. Ninth Air Force had taken the lead.

For clarity and association, TAC has two Numbered Air Forces (NAF) with approximately the same number of active and gained (Air National Guard and Air Force Reserve) units. Ninth Air Force, with Headquarters at Shaw AFB, S.C., is responsible for those units east of the Mississippi River, and Twelfth Air Force Headquarters at Bergstrom AFB, Tex., has the responsibility for those units to the west. With close coordination of Headquarters, TAC and Twelfth Air Force, the CFT concept was further developed. Both Headquarters, TAC and the two NAF's formulated specialized CFT staffs in order to monitor and provide guidance concerning CFT.

Command and Control

Composite Force Training is a relatively new training program within TAC; however, the number and scope of CFT exercises have increased steadily. Active TAC units have hosted 23 CFT exercises since July 1978 and will accomplish approximately 35 total in FY 79. The scope of the type exercise has varied from a single integrated strike package such as SEA BLITZ I hosted by the 58 TTW on 13 Dec 78 to SEA STRIKE 79-1, a 12 AF exercise, which was scheduled over a five day period (12-16 Mar 79) with 4700 sorties flown. (44:1)

The previous excerpt was taken from a Headquarters TAC staff summary sheet submitted by the CFT staff and addresses those variables of size and complexity. To develop an effective command and control arrangement, the respective NAF staffs, in coordination with Headquarters TAC, constructed a Tactical Air Command Regulation (TACR) 51-1 which "establishes standard policy and procedures for Tactical Air Command, USAFR, and ANG unit participation in Composite Force Training." (5:1) In addition to TACR 51-1, each of the NAF's developed and distributed an operation plan (OPLAN), to all their respective units, with detailed instructions as to planning and conduct of CFT operations.

The following terms are defined in accordance with TACR 51-1

and used throughout this chapter:

Initiating organization: The organization that starts action to organize and conduct a CFT operation.

Primary units: The unit responsible for planning, coordination and conduct of a CFT operation. The primary unit may be the initiating unit or one tasked by higher headquarters to serve as the central planning agency.

Commander's representative: A senior officer named as a representative of the Numbered Air Force (NAF) Commander to monitor the conduct of the overall CFT operation. Use of a commanders representative is dependent upon the size and complexity of the operation.

Composite Force Training Director: The senior representative of the primary unit. The CFT Director is responsible for overall mission planning, coordination, execution, and command and control.

Mission commander: The leader of the primary mission force.

Supporting force commander: The inflight leader of a supporting force. Normally, each unit participating will have a supporting force commander.

Control staff: Composed of the CFT Director and individuals selected by the unit to monitor and control conduct of the CFT.

Either the NAF or primary unit can initiate a CFT exercise. The NAF exercise would be of greater magnitude and require longer preparation time. In either case, one or more primary units would be selected, and together with other supporting forces, would plan a detailed scenario in conjunction with the unit's primary mission (air-to-air or air-to-ground). The CFT staff at the NAF level would provide assistance as necessary, and work with Headquarters TAC in arranging participation and support from units outside of TAC, ie: (SAC-tankers

and bombers; MAC-airlift and rescue; ADC-interceptors; other services; and Federal Aviation Agencies (FAA).

Unlike Red Flag where the Red Flag staff has done most of the planning and coordination prior to the unit's arrival, CFT allows the units the opportunity to construct their entire packages. Primary units form a control staff with a CFT Director. This staff acts as the nucleus of the operation and takes responsibility for the entire planning and execution of the exercise. The NAF monitors the planning and conduct of the activities within its respective area of operation, and delegates its authority for command and control to the primary unit Commander for employment. CFT exercises are centrally managed and controlled during the planning and development phases, and decentralized during the execution phase. During NAF large scale CFT exercises, a control staff at the NAF level is formed and managed by an overall Exercise Director. The Exercise Director acts with full authority from the NAF Commander, and delegates this authority to primary unit Commanders for execution. (5:1)

Training Areas

Throughout the Continental United States a variety of training areas are available. Coastal and over water ranges emphasize air-to-air training and joint Air Force-Navy-Marine operations. Inland ranges provide a variety of topographic features including desert, mountainous, and swampy terrain. Among these, TAC has eight major gunnery ranges. In an effort to make targets more realistic, TAC launched a program in 1977 called "Coronet Real" to increase the number and type of targets, while improving realism on the ranges. "Using existing gunnery ranges, pilots just weren't getting much tactical expertise in

preparation for the real thing." (20:45)

TAC ranges were transformed into expertly simulated training areas. The Gila Bend range complex in Arizona, for example, took on three separate and distinct characteristics. The east tactical range was converted into a high-threat environment with EW emitters, SAM sites, and airfields similar to what would be encountered in Europe. On the other side, the north tactical range represents a North Korean arena with tunnels, gun emplacements, and airfields around mountainous terrain. Finally, on the south tactical range desert, a mid-eastern area is depicted with numerous targets throughout. (55)

The improvement of the range complexes has been beneficial. It allows inexperienced aircrews the opportunity to see authentic target arrays and train with them on a regular basis in a realistic environment, resembling what Red Flag provides. Units are taking advantage of these opportunities more and more under the CFT concept.

Realistic Scenarios

Similar to Red Flag, CFT exercises vary in size and complexity. Both Ninth Air Force and Twelfth Air Force, active and gained, units have conducted a variety of small scale CFT operations and participated in the semi-annual NAF large scale exercises.

In January 1979, the 474th TFW, located at Nellis AFB, conducted a one day mission in the Nellis range complex. The scenario consisted of offensive counter air (OCA) on two range airfields and was supported by pathfinder, SCAR, reconnaissance, Wild Weasel, escort, AWACS, and Strategic Air Command (SAC) tankers. F-15's and Marine A-4's provided the enemy threat. This mission package consisted of nine different aircraft types for a total of 48 aircraft. (45:14) The packages can

include more or less participants depending on the range area available and type of scenario.

The Air National Guard unit at Kirtland AFB, N.M. initiated a CFT exercise in Spring 1979 at Holloman-Red Rio in the northern part of the White Sands Missile Range Complex. The scenario was developed for high threat interdiction missions around the Red Rio airfield and defense facilities. Strike flights were escorted into the target area, and the F-15 adversaries, from Holloman AFB, exercised area defense around the Red Rio complex. A total of 58 aircraft, from Guard, Reserve and active Twelfth Air Force units, made up this exercise package. (45:14)

Small scale operations vary in length, from a single day exercise to a week long operation. The 507th Tactical Air Control Wing (TAIRCW) at Shaw AFB, S.C. conducted a five day CFT exercise in June 1979. Unlike previous CFT initiating units, the 507th TAIRCW differed in aircraft type and mission. Their mission was to "plan, direct and control tactical air operations coordinate joint operations with components of other services and provide tactical air support, area air defense, and air space control in the area of operations." (7:1) Even though the majority of the operations involved fighter aircraft flying CAS missions under control of a FAC, the 507th TAIRCW was able to exercise and evaluate other elements of its Tactical Air Control System (TACS). (48:1) Units are encouraged to formulate scenarios which closely parallel their missions while incorporating realistic training.

CFT operations initiated by the NAF's occur less frequently, normally semiannually. These exercises are scheduled for approximately a weeks duration and include greater participation by units from other major commands and services. In conjunction with the CFT operation, active NAF units normally exercise simulated wartime aircraft generation

procedures (ie. aircraft sortie surge). Unlike Red Flag where the majority of the operation takes place on its contiguous range complex, NAF exercises incorporate a variety of different ranges quite distant from one another. Due to the magnitude of this type of operation and location of exercise areas, strict command and control procedures are developed. A detailed operation order (OPORD) is formulated for each exercise and includes specific guidance concerning rules of engagement, range restrictions, special operating instructions, and Federal Aviation Agency (FAA) procedures. Prior to each days exercise, a fragmentary order with that particular days missions is published and transmitted via teletype to all participating units.

An example of a large scale operation took place in March 1979 when Twelfth Air Force initiated a five day aircraft sortie surge in conjunction with a CFT exercise (SEA STRIKE 79-1).

The purpose of the exercise was to provide realistic and productive training while mounting sustained, large scale, accelerated operations. SEA STRIKE involved active 12AF, ARF, ADCOM, SAC, and USMC units in a variety of composite force missions on the tactical ranges in the Holloman, Hill [Gila Bend], and Nellis complexes. (50:1)

SEA STRIKE was an ambitious operation and took place throughout the southwest on four separate range complexes. The selected main target area differed from day-to-day with successive scenarios exercised at Holloman, Hill, Gila Bend, and Nellis tactical ranges. (Fig. 3-2) Unfortunately, the last days exercise at Nellis was cancelled due to weather in the range area. The remaining ranges were used during the week to support sortie surge and unit on-going training missions.

Unit deployments were kept to a minimum, however, the distances involved to reach the various range complexes required some units to pre and post-strike refuel. SAC provided the necessary refueling support

SEA STRIKE 79-1

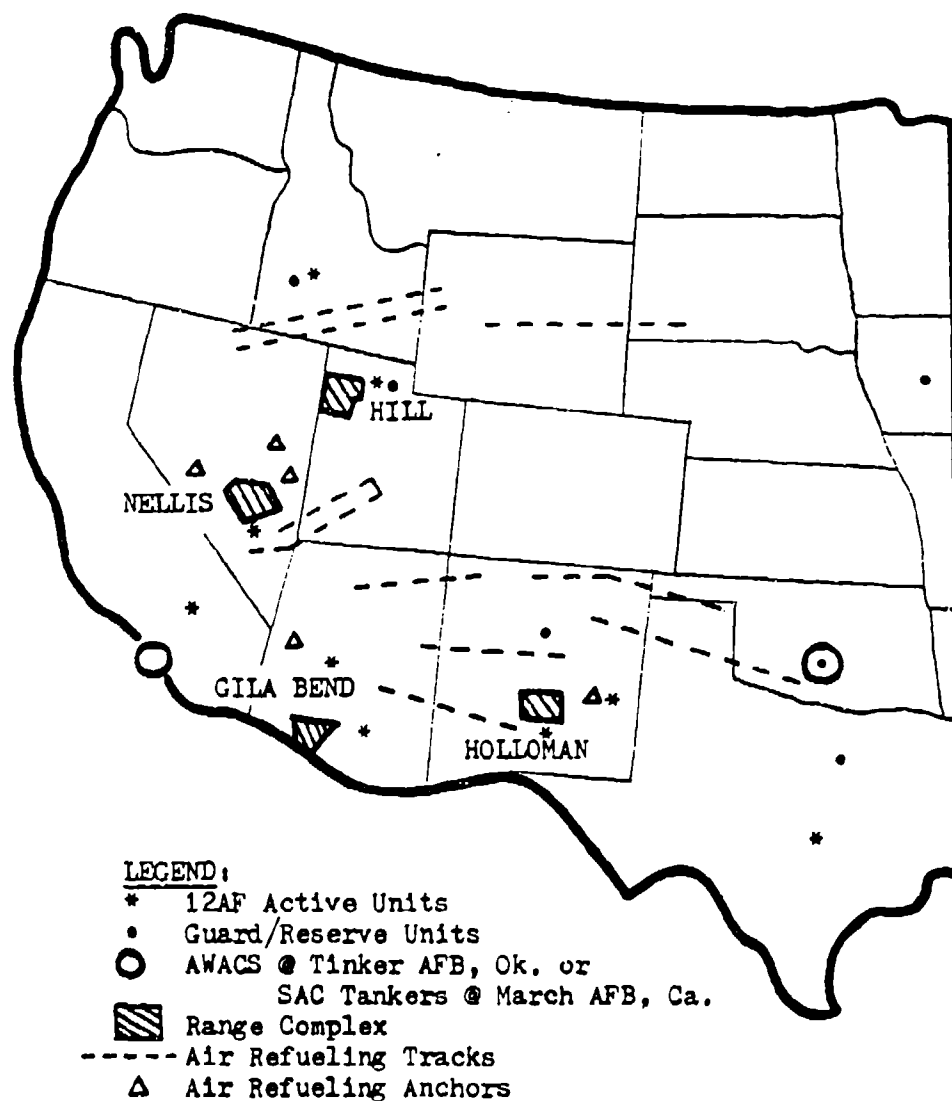


Fig:3-2 SOURCE: Headquarters, Twelfth Air Force Briefing. "Composite Force Training." Prepared for Tactical Air Command Commanders Conference, Homestead AFB, Florida, Spring 1979, Slide #10. (45)

on the numerous air refueling tracks and anchors with 99 tanker sorties refueling 412 fighter aircraft, (45:2) When air refueling support was

not available, aircraft would recover at another base, refuel and continue on the mission or return to its home base.

A typical scenario, which took place during SEA STRIKE at the Holloman-Red Rio complex, consisted of F-15's in an adversary role defending the entry routes into the target complex. Strike flights from a variety of locations were proceeding inbound to attack targets around the airfield or rendezvous with SCAR or pathfinder aircraft for subsequent strikes. Between strike missions, airborne FAC's were briefing their fighter flights and talking them into the target complex while they held outside the high threat area. Missions and scenarios similar to this were repeated throughout the days operations. The complexity of subsequent missions varied from day-to-day and were dependent on the size of the range and the availability of threat assets.

SEA STRIKE 79-1 was Twelfth Air Forces' first attempt in developing a large scale CFT operation. The weeks total results of approximately 4700 sorties, included almost 900 SEA STRIKE sorties from 19 separate units, and were quite favorable. (50:4)

Lessons Learned

It is extremely important to take advantage of past experiences and learn from those lessons. The wealth of knowledge gained through CFT operations helps in the development and execution of viable tactics. For example, the goals of SEA STRIKE 80-1 were to expand the lessons learned from SEA STRIKE 79-1 and increase the quality of training. The following consolidated excerpts from SEA STRIKE 79-1 and 80-1 highlight certain areas: (50 & 51)

Airspace saturation: The scope of large scale CFT exercises exceeded FAA capabilities. During 79-1, the concentration of mass formations

into single range complexes caused Air Traffic Control (ATC) delays and cancelations. Limiting Composite Force (CF) packages for 80-1 eliminated much of this congestion by deploying these smaller packages sequentially and in concert to four major range complexes. However, FAA restrictions still inhibited flights from experimenting with a variety of tactics prior to range entry.

Communication: The luxury of interference free communication will be a thing of the past, and tactics and training should be optimized so that mission accomplishment will not be predicated on communications. When jamming or intrusion is encountered, correct radio discipline and communication procedures must be employed.

Air refueling: The unpredictable fuel requirements of engaged fighters, and distance involved between ranges and unit home stations required established refueling areas. Unlike 79-1, in which SAC tankers operated from one location, 80-1 had the tankers deployed to three separate locations. This procedure allowed for greater flexibility and more timely support.

Tactics and training: The SCAR and pathfinder flights were hard to intercept. Their low altitude and high speed made these flights difficult to detect and reduced the weapons envelope of the interceptor. Frequently interceptors attempting to engage the SCAR or pathfinder aircraft found themselves vulnerable to attack from the trailing strike flights.

Electro-optical (EO) AAA and infrared (IR) SAM: Threat emitters were used when available, and the need for this type training cannot be over emphasized. The effectiveness of certain low altitude tactics depends on the success against EO and IR threats.

Training inexperienced aircrews: Both SEA STRIKES provided an opportunity

for an increased number of participants from each unit vice the smaller numbers usually deployed to Red Flag. The opportunity to attack unfamiliar targets and fly unfamiliar routes provided the stress environment required for maturing less experienced aircrews.

Even though the large scale exercises receive much of the emphasis, the smaller scale CFT operations can be just as important and provide valuable results. The following are examples:

FAC-fighter communication procedures: The line of sight limitations of the UHF radio and operations at low altitudes reduce communication effectiveness. Certain procedures were practiced and developed to keep the FAC out of the high threat AAA and SAM arena and still provide the necessary target information to the fighters. Communication jamming and intrusion added a higher degree of realism. (48)

Torching: The technique of "torching" was employed by F-111 aircraft in South East Asia. The aircraft would dump fuel and then light the afterburner, which resulted in a 150-200 ft. flame behind the aircraft from the fuel ignition. This was used by pathfinder aircraft during a recent exercise to signal the split-up of the trailing fighter flight before attacking the target. The torched off fuel was highly visible to both friendly and threat forces, and not tactically sound. (43)

Unit personnel have a very positive attitude about CFT operations and are enthusiastic in recommending additional exercises. The experience gained in planning and developing an entire operation is extremely beneficial. Coordination between units, and formulation of tactics provides valuable insights into unit capabilities and effectiveness. CFT operations have an accident free record while providing specialized training which cannot be duplicated in a units normal

day-to-day operation. It is an excellent medium for preparing aircrews for participation in Red Flag, and more important, enhance combat readiness. (55)

CHAPTER IV

LOOK INTO THE FUTURE

The future of realistic training will be a challenging one, not only because of resource constraints which we are forced to operate under, but also the growing Soviet threat. When we consider Soviet military productivity, the picture becomes disheartening.

The Soviet Union produces, on the average, three new fighter aircraft every day, seven days a week, fifty-two weeks a year - a squadron a week, a wing a month - and has done so for the last four years. (14:52)

In just over two years, the Soviets can produce an equivalent number of fighter aircraft to equal the present 26 tactical wings the United States possesses. (28) The recent development and addition to the inventory of the F-15, F-16, A-10 and F-4G Wild Weasel aircraft, have improved the TAF's creditability. Many experts consider these aircraft with the latest technology, enhanced survivability, and increased lethality to be the best in the world. This may in fact be true, but Soviet aircraft should not be discounted. Unlike previous and existing United States aircraft development concepts, in which aircraft are normally designed with a dual-mission capability, Soviet aircraft are designed or modified for a specific purpose and perform a certain mission. We have known for some time that the quantitative edge has been in favor of the Soviets, and the United States has relied on a qualitative edge. Recently, the latter conception has been drastically reduced, and it may not be long before a parity exists, if it does not exist already.

The situation we face can be characterized in aviatorial terms

as getting "behind the power curve". This occurs when the airplane is maneuvered into or operating in a critical region where the thrust of the engines is not capable of keeping the aircraft flying. If a pilot finds himself in this situation his only alternative is to gain additional energy to sustain flight by discontinuing the maneuver and getting out of this critical region. The United States needs to discontinue its philosophy of appeasement and concentrate on increasing the momentum of our capabilities before we are in that critical region.

For years the Defense Budget has been reduced and certain programs throughout the defense spectrum have had to be curtailed. Because of the recent confrontations throughout the world, the United States has been forced to reevaluate its present military capabilities. Many congressional and high ranking military officials have highlighted these questionable capabilities to no avail. However, now these officials are achieving more support and the Defense Budget is receiving more emphasis. The formation of new training programs and the development of weapons systems for the active units takes time, and it will be years before the systems are in the inventory and the programs are fully operational. In the meantime, the Air National Guard and Air Force Reserves continue to convert to new more sophisticated aircraft, which requires additional training to regain and improve their expertise and proficiency. (27:88) Implementation of these proposed developments are all well and good, the unanswered question is our military capability at any given time. If ever we become involved in a conflict, we will go with what we have, and realistic training could be our "ace in the hole", for the challenge is definitely real.

"Every man can expect his path to the target, be it airborne or ground based, to be hotly contested. Each man's mastery of the basics will enhance his effectiveness

and survivability. If a lack of training limits his capability to less than maximum performance, his only contribution may be a day-one statistic." (15:11)

Continue To Do More With Less

For years "doing more with less" has been common knowledge and practice throughout the Air Force. The combination of defense spending reductions and the ever increasing energy situation has changed the structure of training in the Air Force. In 1975, prior to the present energy crisis, General David C. Jones, then Chief of Staff of the Air Force, was:

"concerned" that the cuts in flying hours may go too deep. The Air Force, ... is trying to "come up with a happy medium" involving a mix of simulator training, flight training on a low cost trainer, and limited operations of the actual combat aircraft "Our goal ... is to produce well-trained crews at minimum cost." (29:40)

It is the "almighty dollar" or lack of, that has regulated and structured training. Too much emphasis has been placed on simulator training, and aircrews are forced into attempting to increase their proficiency level with the aid of simulators. Except for the newly developed simulators, many of the present day systems are not simulators but rather procedural trainers. These trainers lack the sophistication and capability to realistically portray aerial simulations. Even though these systems are misnomered as simulators, aircrews normally receive only basic familiarization. Emphasis must focus on the development of new more realistic aircraft simulators and modernization of those already available systems.

Increased use of simulators is not the answer for realistic training - actual flying is. (55) The experience of performing missions in a multi-threat environment cannot be totally simulated. "A good number of veteran pilots come back from [Red Flag missions]

sweating ... their hair standing on the backs of their necks like they did in combat." (23:22) These psychological and physiological effects can only be realized through actual participation not simulations. When a facility like Red Flag is not accessible, other flying training methods need to be explored.

Due to the reduction of sortie allocations and the limitations of flying hours, productivity of each sortie is critical. Management procedures and scheduling techniques must regulate sortie allocations to take full advantage of all available training facilities and maximize training accomplishments. Even with constant attention, the above procedures are imperfect and affected by a variety of variables such as weather, maintenance, aircrew proficiency, etc. Since we are governed by constraints, it is imperative that we capitalize on realistic training efficiency with the assets and resources available.

Air Combat Maneuvering Instrumentations (ACMI) is a versatile system which has been operational since 1976 in the Nellis range complex. This system provides pilots the opportunity to fly realistic air-to-air combat and later review the battle on three dimensional displays showing all phases of the engagement. ACMI is able to track 20 different aircraft simultaneously, and provide real time all-attitude data on eight aircraft during the engagement. These aircraft carry an airborne instrumentation pod that ties into the ground display systems and provides data such as airspeed, altitude, G's, angle of attack, weapons status, simulated missile firings and other critical information concerning airborne engagements. The ground facility can continually monitor the entire operation through its computerized display screens. Not only can the dimensional view be rotated, additional options are available such as the pilots view from the

cockpit of the attacking aircraft. Zerox machines are tied into the system and provide actual copies of selected sequences, while the entire operation, both voice and video, is taped. (28:100) ACMI is a fabulous system and its potential is tremendous. Even though ACMI concentrates on the air-to-air arena, modification of this type system could be extremely beneficial during air-to-ground missions. Tactics employed, delivery techniques, threat assessment, and accurate scoring are a few critical areas which ACMI data could provide.

The problem with ACMI is its limited availability. Because of its multidata versatility, ACMI is used for many high level weapon system test programs. (55) Utilization by Red Flag participants has been limited, however, Tactical Air Command (TAC) has emphasized the need of incorporating ACMI or systems similar to ACMI into Red Flag scenarios. Implementation of instrumentation ranges throughout the United States by the Army, Navy and Air Force will provide lasting benefits in furthering realistic training. (28:96)

Within TAC there is another flag program called Blue Flag. In 1976 it was conceptualized because of "the success of Red Flag and served to focus attention on the need for more realistic training exercises for the middle-level battle manager." (28:197) The Blue Flag program takes place at Eglin AFB, Fla., and exercises operations and intelligence functions. Aircrews are getting valuable realistic training with Red Flag and Composite Force Training (CFT), and now middle-level staffs are gaining management experience through Blue Flag. Programs and systems as those mentioned continue to provide benefits, and until we acquire new resources, we will continue to train effectively with all available assets.

Emphasize Inter-Service and Inter-Allied Participation

Inter-service rivalries were common occurrence over the years, and they constantly plagued mutual support efforts.

In past wars, the Army and the Air Force worked together and fought together effectively as one. Conflicting doctrines were put aside and workable ad hoc procedures were established Between wars, the daily interaction lessened or vanished, ... Competing parochial interests often replaced logic ... in the force structure development and weapon system acquisition process Today, Army and Air Force are working harder at cooperation than ever before in peacetime.... TAC and the Army's Training and Doctrine Command (TRADOC) have joined in an unprecedented cooperative effort to develop concepts, procedures and tactics in order to make the most efficient and effective use of existing forces. (14:45)

Mutual Army-Air Force cooperation efforts include a variety of training operations.

Blue Flag exercises: Army-Air Force staffs are integrated and coordinate the effective use of air resources for close air support (CAS) in a European or Korean theater. (28:197)

Red Flag exercises: Army missions and roles vary according to the scenarios. During one particular scenario conducted in mid-1976, Army paratroopers from Ft. Bragg, N.C., were loaded on Military Airlift Command (MAC) aircraft for a local mission. Unknown to them, the paratroopers would be flown nonstop to the Nellis range complex. Enroute the paratroopers were briefed on their mission. The aircraft flew through the range complex escorted by friendly fighters, and were attacked by enemy airborne and surface threats. The aircraft then proceeded south to the Ft. Irwin complex and the paratroopers jumped into a simulated war while being supported by tactical air. A slightly different mission for the Ft. Bragg soldier. (46:13) (Fig:4-1)

National Training Center (NTC) exercises: The NTC is the Army's version

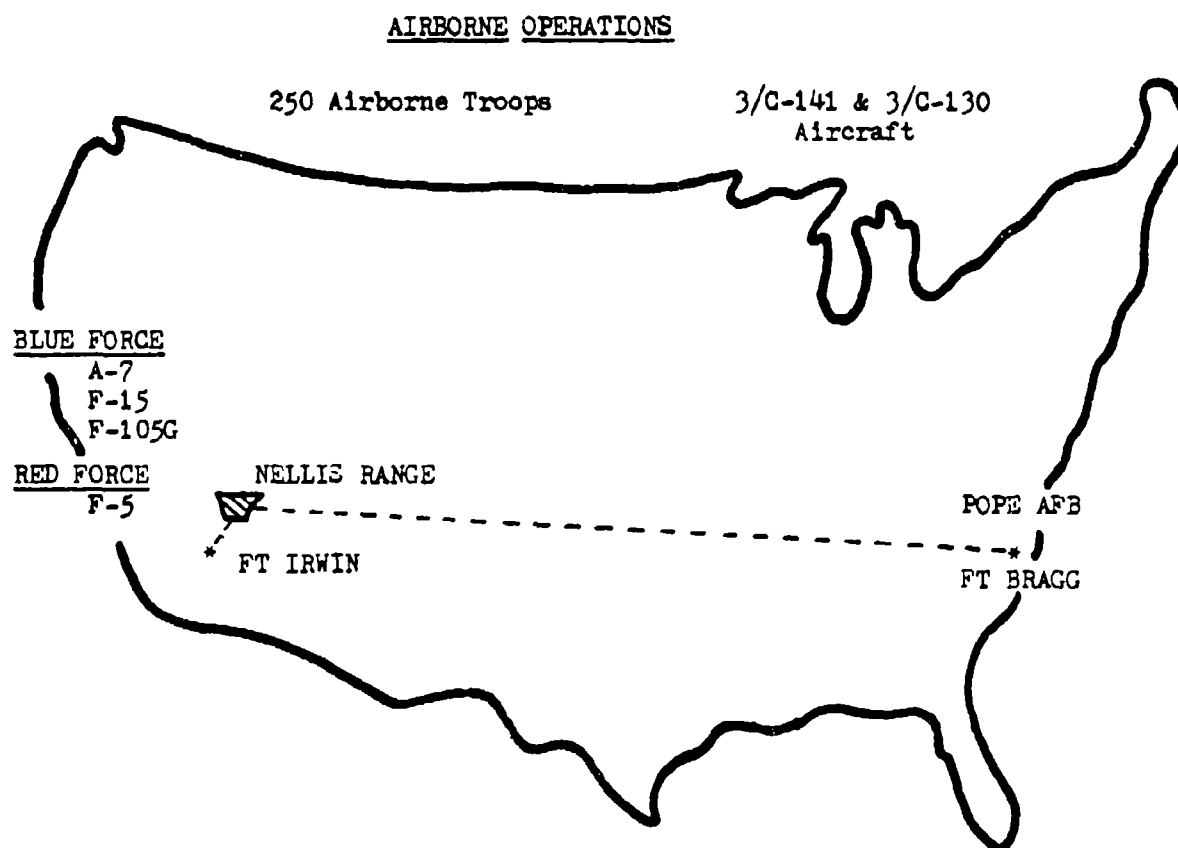


Fig:4-1 SOURCE: Presentation to Kansas National Guard by Lt. Gen. James D. Hughes, 16 April 1977, Slide #31. (46)

of TAC's Red Flag. In fact it has adopted a similar motto; "Train as it will fight" - by total immersion of a battalion task force in a realistic battle environment." (54:I-6) The above motto is quite understandable since the Ft. Irwin complex is located near Nellis and mutual support exercises are common. In December 1978, the Army conducted a joint forces exercise called AUTUMN SAFARI, and it was supported by aircraft from Red Flag 79-1. During this month long operation approximately 600 CAS sorties were flown. Problems concerning timely CAS and support of the Army operation on a 24 hour basis were highlighted, and should be considered in future

joint exercises. (41:1) Even though the Red Flag staff has agreed to provide CAS and threat force air strikes when available, Ft. Irwin still continues to generate additional 30-day exercises under the program title of "Task Force Irwin (TFI)" without support from Red Flag. TFI is a program contrived to provide "training beyond that which can be conducted at home stations [and] scenarios are designed to enhance tactical maneuver, integrated live fire, electronic warfare, close air support (CAS) and [nuclear, biological and chemical] NBC training." (8:1) It is estimated that by mid-1980, "42 battalions will rotate through the NTC each year." (53:5) Additional aerial support will be needed, and could be furnished through the CFT concept or by Air Force, Navy and Marine units located in the immediate vicinity.

The Ft. Irwin complex is extremely important, but there are other Army ranges scattered throughout the United States which can be used for training. Many of those ranges have been used in conjunction with CFT operations and other joint service exercises. The close proximity of some of these ranges allows the aircrews frequent exposure to joint operations.

The Tactical Air Forces (TAF) continue to focus attention on joint operations with the Army. A major portion of the TAF's mission is in support of the Army and the ground battle, and the emphasis is justified. However, emphasis on other services cannot be discounted.

The Navy and Marines play an important part in fostering realistic training. It was the Navy who first developed the "Top Gun" program at Miramar Naval Air Station in 1968 and enlightened the Air Force on proper dissimilar air-to-air training. (16:824) The Air Force patterned its ACMI system after the Navy's air combat maneuvering

range (ACMR). (28:100) These noteworthy accomplishments are only examples of the value gained through inter-service programs. Both the Navy and Marines are valuable assets in Red Flag, CFT and, joint operations. They continue to boost the effectiveness of realistic training.

When we work with other services we gain a wealth of knowledge, but when we can combine that knowledge with that of our allies it continues to multiply. Inter-allied participation is an important ingredient in developing and employing realistic tactics.

Most allied participation in North America takes place at Nellis in Red Flag. However, as previously mentioned in Chapter II, there is another flag program that is part of Red Flag - called Maple Flag. As the name symbolizes, Maple Flag is hosted by the Canadian Air Force and takes place at CAF Cold Lake, Alberta. Both the United States and British Air Forces take part in this semiannual exercise. Range areas are extremely flat and the facilities are not as sophisticated as those employed at the Nellis range. Certain Nellis threat emitters are deployed into the Canadian ranges to add realism. Even with these limitations, Maple Flag provides the opportunity for NATO Allies to practice actual Army-Air Force European scenarios. Since Maple Flags inception in 1978, four exercises have been completed compiling over 5500 sorties and 7800 hours, while approximately 2500 American and NATO Allied aircrew members were exposed to valuable training. (49) These figures will continue to increase as Maple Flag matures.

Inter-service and inter-allied participation cannot be over emphasized. The need exists for improving and expanding those operations underway. We have learned and will continue to learn valuable lessons from training with other services and allies. General Jones summed it up in 1977,

"We would like the unifying theme to be partnership: partnership with our allies, and among services and commands. We need to focus our training on the innovative use of resources in a truly common effort linked as closely as possible to wartime conditions."
(30:52)

Imagination - The Only Limit

American innovation and ingenuity have provided the means for potential success by contributing to the creation of some of the finest aerial weapon systems in the world. As military professionals it is our charter to utilize these new additions to our inventory and maximize their potential. We must consolidate the nucleus of tactical experience and knowledge, both past and present, in studying problem areas, recommending solutions, and evaluating tactical concepts which will enhance our readiness and employment of the TAF's.

Red Flag is a typical example of innovative thinking. Certain staff members contrived the program and received support from other high ranking individuals, and the operation has evolved into a successful realistic training environment. Red Flag has provided the opportunity to practice new tactics and employment of new weapons. Strategic Air Command (SAC) has exercised specific Emergency War Order (EWO) missions to test its low level single aircraft penetration capabilities for simulated nuclear deliveries. While on the other extreme, SAC has evaluated its variable altitude conventional contingency bombing operations. Along the same lines, tactical fighter units assess the employment variations of beacon bombing, radar bombing, and air support radar team (ASRT) missions, both conventional and nuclear. (55)

Unit personnel participating in Red Flag have changed certain tactics because of proven results. In 1977, Air National Guard crews suggested

they could negate the threat from the simulated Soviet ZSU-23-4 and ZSU-57 antiaircraft guns by making low-level penetrations inside their effective tracking ranges they were able to penetrate and evade the 23-mm and 57-mm systems at close range, ... [but would have] sustained heavy losses when they disengaged and flew out of the battle field area. (28:187)

Video evidence provided the above results, and it caused the crewmembers to reevaluate their tactics and vary the formations while incorporating random jinking techniques. In this case the innovative tactics did not work, but the understanding gained helped develop new tactics. This is what innovative tactics are all about, a constant circle of imaginative ideas until an optimum or near optimum solution can be realized.

Other areas that have achieved success in developing new tactics include.

Joint Attack Weapons Systems (JAWS): JAWS is an Air Force-Army joint operation using A-10 and Army attack helicopter resources to "develop highly effective new tactics that would be used to destroy advancing Warsaw Pact armored forces in Europe and air defenses used to defend the enemy armor." (28:217)

Electronic warfare (EW) programs: EW systems are designed to "protect command's aircraft from engagement by an enemy and increase their ability to disrupt an enemy's command and control communications system." (28:134) The ALQ-131 electronic countermeasure (ECM) pod provides the greatest flexibility fighter aircraft have ever had in the electronic jamming environment by allowing them to readily program to new enemy threats. (55)

FAC tactics: FAC control on the forward edge of the battle area (FEBA) continues to receive emphasis. The following excerpt is an Army general's view on a possible solution.

"... Scout and attack helicopters are extremely

survivable at nap-of-the-earth altitude while maintaining a standoff of a couple thousand meters scout helicopters could provide the FAC with a capability he has never had. Similarly, a case can be made for putting the FAC in a tank or an infantry fighting vehicle."
(13:57)

Additionally, the Air Force development community has given us some new arrows for our quiver.

PAVE TACK: This program markedly enhances our night fighting capability by marrying the F-111F and the F-4 fleet with a cache of "smart bombs".

AIM-9L (Sidewinder): This missile promises to revolutionize air-to-air warfare and dramatically affect the geometry of aerial engagements with an all aspect infrared (IR) missile.

Airborne Warning and Control System (AWACS): We are just scratching the surface for the optimum utilization of the AWACS and the fighter team. This problem needs to be worked harder. (55)

These are only a few specifics, and we must continue to look downstream toward enhancing our capability and focus on those major challenges we face in the near term. More emphasis is needed in expanding training programs like Red Flag and CFT; expanding and improving range facilities, both here and overseas; increased implementation of sophisticated systems like AWACS and ACMI; and more involvement with other services and our allies.

Assessment of the Yom Kippur War taught us many things, and in particular:

Innovative tactics and deployment are the keys to success and survival in a high threat environment and are predicated on flexible, clever use of command and control, ECM support jamming, integrated drone operations, deception, and early use of antiradiation missiles against enemy radars the overriding requirement is for highly trained and experienced aircrews without whom innovative tactics cannot be implemented.
(32:30)

All ideas should be considered. Remember, an idea that proves effective in one situation may kill you the next time. Keep those wheels turning in your head, and train like our survival depends upon it.

CHAPTER V

SUMMARIZATION, CONCLUSIONS AND RECOMMENDATIONS

Summarization

Historical evidence of World War II, Korea and South East Asia have provided valuable but alarming statistics concerning Tactical Air Forces' (TAF) past performances and capabilities. These results highlighted the need for TAF's to train in a realistic environment during peacetime, and allow aircrews to repeatedly experience their first ten combat missions. Current realistic training programs and capabilities are examined in this thesis, providing a consolidated document on that realistic training already available to the fighter force.

An in depth study of the most well known current realistic training program - Red Flag - is addressed in Chapter II. Composite Force has been developed from the Red Flag concept, with the objective, as discussed in Chapter III, of allowing aircrews to train realistically on a more continuous basis. A synthesis of Red Flag and Composite Force programs and concepts, and how they have affected and will continue to affect future realistic training throughout the TAF's is explained in Chapter IV.

Conclusions

Realistic training programs like Red Flag and Composite Force are helping active and reserve forces prepare for any eventual contingencies. The Soviet threat is definitely real, and the possibility of future conflicts appears to be even more real. The ultimate test for

evaluation of our fighter force capabilities will be actual combat. Until that judgment day, if and when it occurs, emphasis will continue to focus on preparing the fighter force.

Realistic training prepares the fighter force and benefits both experienced and inexperienced aircrews. Experienced aviators are able to continue to improve their expertise and maintain a high level of combat proficiency. Less experienced crew members gain confidence in their tactics and are exposed to typical combat situations.

Realistic training programs provide the means to test innovative ideas. Unlike actual combat conditions where the tactic employed may prove fatal, those aircrews involved in realistic training are able to "walk away to fight another day." The valuable lessons learned from these programs furnish the knowledge necessary for the development of formidable tactics. The ability to minimize aircrew losses and validate tactics while training under near authentic combat conditions adds credibility to realistic training programs.

The objective of realistic training is to reduce combat statistics by allowing aircrews the opportunity to continuously fly their first ten combat missions. Red Flag, Composite Force, Maple Flag, Blue Flag and other programs provide these opportunities. Even though present realistic training concepts may not be the ultimate answer in preparing the fighter force, it certainly has potential and will influence any future training.

Recommendations

Over reaction to accidents seems to be the worst enemy for realistic training programs. We know that accidents will continue to occur, but the reaction of commanders concerning accidents is unpredictable. Certainly, appropriate investigative actions are necessary

after an accident, and certain restrictions need to be imposed until a cause can be determined. The problem develops when the investigation has been completed and the causes have been determined or the causes have been categorized as undetermined. In either case, many times the initial restrictions concerning altitudes, formations, delivery techniques, etc. are continued. Unless the actual cause of the accident was due to an unsafe tactical maneuver, the restrictions should be lifted. This often is not the case, and the realistic training environment receives setbacks. Additional justification is required to once again use the original parameters. Many times this justification process involves the loss of valuable time which could have been used more profitably training with the original parameters. If we are going to "be prepared" and "train the way we expect to fight", we must accept reasonable risks, and if or when an accident occurs, the realistic training program must be put back on course as quickly as possible.

Another problem area concerns innovative thinking. Innovation is a vital part of any realistic training program. However, certain innovative ideas are sometimes stifled by unit commanders or higher echelon command positions. This can be attributed to a lack of understanding of a new concept or the failure of certain individuals to provide support in fear of career progression. Regardless of the reason, realistic training programs feel the effects. Whether ideas are conventional or unconventional should not be a factor. Innovative concepts should be given a fair evaluation to determine if they are worthwhile or unfeasible. Commanders need to keep an open mind when making such determinations.

The expansion of realistic programs throughout the Continental United States has received much emphasis. Other areas around the

globe have also concentrated on developing realistic training programs. The Pacific Air Force in the Phillipines has COPE THUNDER a "mini-Red Flag" program for its TAF's in the Pacific area. In Europe, the air-to-ground range situation has been a problem in that units travel extensive distances to complete their missions. Efforts are underway to improve this situation, and allow for more inter-allied training. The more realistic programs that are conceived, both home and abroad, the better prepared our fighter forces will be to meet any contingency.

Recent events throughout the world have focused attention on our military capabilities. These capabilities are beginning to be questioned. It is imperative that we as Americans emphasize the necessity to devote more funds to our Defense Budget and build up and train our military to its potential. Then, and only then, will we be able to discourage any future confrontation.

GLOSSARY OF TERMS

The following definitions of terms used throughout the study are provided. Military documents and publications have provided the original source.

Adversary: An aircraft/unit other than the aggressors used as a Red Force air-to-air asset.

Aggressors: A unit located at Nellis Air Force Base, Nevada, and used as a Red Force asset to provide resources and expertise in dissimilar air combat training.

Airborne Warning and Control Systems (AWACS): E-3A aircraft provides all altitude surveillance, warning, and control in support of air operations.

Air interdiction: Operations conducted to destroy, neutralize, or delay the enemy's military potential before it can be brought to bear effectively against friendly forces. These operations are conducted in enemy territory some distance from the forward edge of the battle area (FEBA).

Air support radar team (ASRT): Mobile radar teams in the field capable of accurately navigating fighter/bomber aircraft to selected targets.

Air superiority: To gain and maintain air supremacy, thereby preventing enemy forces from effectively interfering with friendly surface and air operations.

Anti-aircraft artillery (AAA): Weapons and equipment for actively combating air targets from the ground.

Area/Point defense: Protection of a sector or point target against

air-to-ground and air-to-air threats.

Beacon bomb: Strike aircraft such as F-111, use on-board radar to strike targets using offsets from a remote radar beacon positioned in the vicinity of the target area.

Blue Force: Deployed/tasked (friendly) units supporting the specific mission of the planned scenario.

Close air support (CAS): An air action against hostile targets in close proximity to friendly forces, and requires detailed integration of each air mission with the fire and movement of these forces.

Combat air patrol (CAP)/Escort: Aircraft which have the responsibility of protecting friendly aircraft from an aggressor/adversary force.

Composite Force (CF): A force made up of different aircraft with dissimilar roles to accomplish a specific mission (ie: fighter, SCAR, escort etc.).

Composite Force Training (CFT): One or more composite force missions designed to provide realistic training in a multi-force (friendly and threat) environment.

Continuation training: Required ground and flying training for qualified aircrews to maintain a combat ready status.

Defensive counter air (DCA): All measures (active and passive) designed to reduce or nullify the effectiveness of threat airborne attacks. Active DCA consists of detection, identification, interception and destruction of airborne threats. Passive DCA consists of missions that do not involve employment of active weapons ie: radar, warning systems, camouflage etc.

Designed Operation Capability (DOC): Mission for which a unit was organized or designed (ie: air-to-ground or air-to-air).

Dissimilar air combat training (DACT): Aerial training engagements

involving different types of aircraft with unlike characteristics and performance, ie: F-4 vs F-15, F-16 vs F-5. The objective is for aircrews to become more familiar with air-to-air tactics while engaging unlike (dissimilar) opponents.

Forward air controller (FAC): An Air Force aviator located with forward units to control and direct strikes against targets of opportunity and close air support missions.

High threat area: A sophisticated environment consisting of various ground and airborne systems defending that particular area.

Homeplate training: The normal every day flying accomplishments that are completed at the units permanent location.

Initial qualification training: The prerequisites and minimum training requirements to transition aircrews into the unit aircraft when a formal USAF training course is not available.

Offensive counter air (OCA): Operations conducted to seek out and destroy enemy airpower as close to its source as possible. These operations include air-to-ground attacks against aircraft, support facilities, air defense systems and air-to-air engagements to destroy hostile aircraft in enemy airspace.

Pathfinder: A low level strike mission consisting of a flight of fighters led by an aircraft with sophisticated navigation systems, such as an F-111, into a high threat area. The strike flight maintains trail formation on the F-111 into the target area.

Radar bomb: Strike aircraft use on-board radar to locate and strike radar show and no-show targets using natural radar returns.

Red Flag: A realistic training operation conducted at Nellis Air Force Base, Nevada. A variety of units deploy and participate in an

assortment of air-to-air and air-to-ground scenarios against air and surface threats.

Red Force: (Threat) forces tasked to oppose the Blue Force.

Spin's: Special instructions published for each exercise.

Strike control and reconnaissance (SCAR): Missions flown by RF-4C aircraft to include reconnaissance, surveillance, and strike control on targets of opportunity and in conjunction with interdiction missions.

Suppression of enemy air defenses (SEAD): Strikes on SAM, AAA sites, and associated radar guidance units.

Surface-to-air missile (SAM): Surface launched missile that is designed to operate against airborne targets.

White Force: (Neutral) force made up of programmers, controllers, and evaluators for all Red Flag operations.

Wild Weasel: An aircraft system, such as an F-4G with sophisticated electronic warfare equipment that enables it to detect, identify, and locate enemy radars and to direct against them weapons for their destruction or suppression.

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